WHAT IS CLAIMED IS

1. A method of fabricating a non-volatile memory device, the method comprising :

forming a sacrificial oxide film on a semiconductor substrate and selectively etching the sacrificial oxide film to expose the semiconductor substrate with a predetermined width;

injecting first conductive type impurity ions into the exposed semiconductor substrate to form a first semiconductor region;

forming an additional oxide and nitride film on the entire upper surface of the semiconductor substrate in order;

etching the nitride film, the additional oxide, and the sacrificial oxide film selectively to form a gate window which exposes the semiconductor substrate with a predetermined width;

forming a gate oxide film over the entire upper surface of the semiconductor substrate;

forming polysilicon layer on the gate oxide film to fill in the gata window;

carrying out a CMP (Chemical Mechanical Polishing) process until the sacrificial oxide film is exposed;

removing the sacrificial oxide film, and the gate oxide film film, the nitride film, and the additional oxide formed on the side wall of the polysilicon layer; and

injecting second conductive type impurity ions into portions of the semiconductor substrate, which corresponds to the outer part of the polysilicon layer, to form source and drain regions.

2. A method as defined by claim 1, wherein in carrying out a CMP process until the sacrificial oxide film is exposed, the etching process is closed at the point of time when the nitride film is exposed using the nitride film as a polishing stopper layer, and then the sacrificial oxide film is exposed by carrying out over-etch for a predetermined time.

3. A method as defined by claim 2, wherein the sacrificial oxide film, and the gate oxide film, the nitride film, and the additional oxide formed on the side wall of the polysilicon layer are removed using a wet-etch.

4. A method as defined by claim 1, wherein the source and the drain regions are formed by injecting second conductive type impurity ions into the silicon substrate using the polysilicon layer as a mask to form an LDD (Low Doped Drain) region, and forming side-walls on the side walls of the polysilicon layer, and then injecting the second conductive type impurity ions into the semiconductor substrate using the side-walls and the polysilicon layer as a mask.

5. A method as defined by claim 4, wherein, before forming the LDD region, a protection film is formed over the entire upper surface of the semiconductor substrate.

6. A method as defined by claim 2, wherein the source and the drain regions are formed by injecting second conductive type impurity ions into the silicon substrate using the polysilicon layer as a mask to form an LDD region, and forming side-walls on the side walls of the polysilicon layer, and then injecting the second conductive type impurity ions into the semiconductor substrate using the side-walls and the polysilicon layer as a mask.

7. A method as defined by claim 6, wherein, before forming the LDD region, a protection film is formed over the entire upper surface of the semiconductor substrate.

8. A method as defined by claim 3, wherein the source and the drain regions are formed by injecting second conductive type impurity ions into the silicon substrate using the polysilicon layer as a mask to form an LDD region, and forming side-walls on the side walls of the polysilicon layer, and then injecting the second conductive type impurity ions into the semiconductor substrate using the side-walls and the polysilicon layer as a mask.

9. A method as defined by claim 8, wherein, before forming the LDD region, a protection film is formed over the entire upper surface of the semiconductor substrate.